

Notes on Fossil Plants from Mingenew and Irwin River, by
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Plant remains from the Jurassic strata near Mingenew were described by Dr. E. A. Newell Arber in 1910. Although the presence of a Permo-Carboniferous flora at Irwin River does not appear to have been recorded up to the present time, Mr. E. de C. Clarke informs me that Sir Edgeworth David obtained several specimens of *Glossopteris* during his visit in September 1921.

The specimens described below were obtained by a party of University students under the leadership of Mr. Clarke in May 1923.

JURASSIC PLANTS FROM OUTCROP OF FERRUGINOUS SANDSTONE ON
SIDE OF MINGENEW-MULLEWA ROAD THREE MILES N. OF
MINGENEW.

Otozamites feistmanteli Zigno 1881.

A number of specimens belonging to this species are in the collection, amongst them being two fine fragments of fronds about 130 mm. in length.

Nos. G3778 and G3813 are well preserved, enabling the venation to be seen most distinctly, and exhibiting the outline of many of the pinnules as well as the auriculate upper edge.

The pinnules are straight with a bluntly rounded apex, slightly imbricate, attached to the upper side of the rachis by a broad base with an auriculate upper edge.

There is a certain amount of variation in the shape and size of the pinnules; the length ranging from 8 mm. (G3815) to 20 mm. (G3778 and G3814), and the width from 5 to 6 mm.; also in the longer pinnules the tip is less bluntly rounded than in the shorter ones. The veins, which are numerous and branching, radiate from the point of attachment, where they number from 10 to 12, and are obliquely cut off when they reach the margin. Measurements taken at random showed that about 20 veins are present in 5 mm.

The remains from this locality identified by Arber are not available for comparison, but there is every reason to believe that specimens G3777, G3778, G3813, G3814 and G3815 fall within the

limits of variation referred to by Arber (l.c. p. 26). At the same time it must be pointed out that the plants do not agree with Dr. Walkom's description of *Otozamites feistmanteli* from the Walloon Series of Queensland, which has the pinnules 12 mm. long, 4 mm. wide and the veins "divergent and dichotomous, being about 6 or 8 in number at the base and up to 12 in the widest part." Nor can they be assigned to Walkom's *Otozamites cf. mandelslohi* Kurr, which is defined "Fronde linear, narrow, with a breadth of about 1.5 cm. The pinnae are rather orbicular, 8 to 9 mm. long and 7 mm. wide, with an obtusely rounded apex; they overlap slightly and are auriculate at their upper margin; they are attached to the upper surface of the rachis, the veins are numerous, fine, divergent and dichotomous, there being about 15 to 20 in a space of 5 mm."

Specimen G3777a, from near the apex of a frond, is similar to the others in most respects but differs in having all the pinnules slightly falcate. The apical pinnules are shorter and narrower than the basal ones but show the same amount of imbrication.

Pagiophyllum sp.

Specimen G3779 consists of a portion of a twig which seems to be identical with the *Pagiophyllum* sp. of Arber's paper (op. cit. p. 27).

PERMO-CARBONIFEROUS PLANTS FROM CARBONACEOUS SHALE UNDERLYING THE LOWEST COAL SEAM IN THE NORTH BRANCH OF THE UPPER IRWIN RIVER.

? *Phyllothea* sp.

Specimen G3812 contains various plant remains including a piece of stem which may be *Phyllothea* sp. or *Schizoneura* sp., *Glossopteris browniana* and a number of indeterminate fragments.

Specimen G3811 is covered on one side with *Glossopteris browniana* Brong. and numerous ribbed leaflets which may belong to species of *Phyllothea*.

Sphenopteris lobifolia Morris 1845.

Specimen G3810 consists of a portion of a frond, probably subapical, with one complete and six incomplete pinnae. The complete pinna is attached to a fragment of the rachis which is so imperfect that it is impossible to distinguish its wings; it does, however, show indications of the presence of a sub-opposite pinna. The pinnules are decurrent, roughly oval, and have a lobed margin. Their shape and venation very closely resemble the *Sphenopteris*

lobifolia figured by Arber in the *Glossopteris Flora* (British Museum) on Plate V., figure 2. The species was first collected in the "Newcastle Coal Mines," New South Wales (type locality) and has subsequently been obtained in the "Upper Coal Measures of Newcastle" (Feistmantel), Port Stephens and Mulubimba in New South Wales, and from the Upper and Lower Bowen Series of Queensland (Walkom). It is now recorded from the Permian-Carboniferous Beds of Western Australia for the first time.

***Glossopteris browniana* Brongniart 1828.**

Specimen G3804, a small incomplete frond, with a well marked midrib, which appears to persist to the apex, is assigned to this species. At its widest part it measures 18 mm.; its length is 54 mm.

Specimen G3806 contains three imperfect, elongate fronds with meshes which are short, broad and polygonal close to the midrib where they form one or two series before sweeping round obliquely to divide into the narrow polygonal meshes which occupy the greater part of the lamina. These three fragments I consider to be young fronds of this species.

Specimens G3811 and G3812 contain fragmentary fronds of this species associated with other plant remains.

***Glossopteris indica* Schimper 1869.**

Specimen G3805 is considered to belong to this species, the midrib is well defined and the nervure very distinct up to the arched margin for approximately two-thirds of the right side.

***Glossopteris ampla* Dana 1849.**

Specimen G3809 consists of a fragment of a very large frond 83 mm. long and 70 mm. wide, too imperfect to show anything beyond the midrib and the veins of the lamina, and indicating that the perfect frond was at least 110 mm. across. The median rib is strong but so imperfect that it is impossible to determine the structure; the nerves are parallel and more widely separated than in the specimens of *G. browniana*, *G. indica* and *G. angustifolia* being from .5 to 1.0 mm. apart; their emergence is not visible but they are soon arranged in a direction almost at right angles to the median nerve, so that the change of direction must take place very close to the midrib. The nerves may be simple or they may divide once, twice or three times in a distance of 50 mm., and in a few places they seem to anastomose. This fossil by its large size and its style of venation differs from all the described and figured species of Australian *Glossopterids*, though it seems to be most closely approached by Dana's *Glossopteris ampla* which is

described by Arber (op. cit., p. 79): "Frond usually large, broadly oval, apex obtuse or emarginate; midrib stout, especially in the lower portion of the frond, but not persisting quite to the apex. Lateral nerves arched at midrib, forming one or two series of comparatively broad and short meshes, and then subdividing into a number of close, almost parallel veins, often very oblique, forming extremely narrow elongated meshes."

Walkom remarks concerning this species that it "is fairly easily distinguished from *G. indica*, the only species which approaches it at all closely, by the character of the network and the general appearance of the secondary venation. The meshes close to the midrib are short and broad, and in marked contrast to those further away, which are long and narrow. The secondary veins are generally straight, sometimes with a tendency to curve slightly upwards near the margin." And further, "the larger fronds examined . . . are obviously more than 20 cm. long and 8 cm. wide and have an obtuse apex. The midrib is strong, up to 4 mm. wide, with a number of longitudinal striations. The meshes formed by the secondary veins are short and broad for a few rows along the midrib, but further out they become very long and narrow, the veins being sub-parallel. In the lower and central portions of the frond, the secondary veins are practically at right angles to the midrib (75° - 90°)."

Feistmantel's *Glossopteris taeniopteroides*, regarded by Arber and others as a synonym of *G. indica*, which should also be taken into consideration, is rather narrower and has a more acute venation, the meshes of which are "larger on the borders of the midrib, contracting towards the margin" (Arber, op. cit., p. 66). The Irwin River frond differs from these in the absence of broad, short meshes near the midrib and the veins being straight, not showing a tendency to curve upwards near the margin.

? *Gangamopteris* sp.

Specimen G3807, a fragment of a leaf without any trace of midrib and with the veins dividing by dichotomy and anastomosing to form a network is hesitatingly determined as belonging to this genus.

? *Noeggerathiopsis* sp.

Specimen G3808, another fragment showing no trace of midrib, with the veins almost parallel dividing but not anastomosing to form a mesh, is considered to belong to some species of this genus.

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